前面4个月，目标：single variable clculus, multivariable calculus, linear algebra for economics and engineering

1007 single variable calculus

Course Contents – List of Topics:

Review of Basic Concepts
Function Notation
Parent Functions and Transformations
Domain and Range
Trigonometry
Inverse Trigonometric Functions
Log Laws
Piecewise Functions
Odd and Even Functions
Limit Notation & Graphical Representations
Evaluating Limit Expressions Using Limit Laws
Continuity and Intermediate Value Theorem
Limits Involving Squeeze Theorem
Limits Involving Infinity
Instantaneous Rates of Change & Average Rate of Change
Derivative Definition
Derivatives Rules using Constant Rule, Power Rule, and Sum Rule
Derivatives Rules using Product Rule, Quotient Rule, and Chain Rule
Derivatives of Trigonometric Functions, Exponential Functions, and Inverse Functions
Implicit Differentiation
Logarithmic Differentiation
Linearization
Critical Points
Absolute and Local Extrema
First Derivative Test
Concavity & Inflection Points
Second Derivative Test
Curve Sketching
L'Hopitals Rule ($\frac{0}{0}$ and $\frac{\infty}{\infty}$)
L'Hopitals Rule (1^{∞} and $(\infty)^0$ and 0^0)
Antiderivatives
Definite and Indefinite Integrals
Fundamental Theorem of Calculus
Area Under Curves & Area Contained Between Curves

single variable calculus (2007)

Topics

Indeterminate Forms and L'Hôpital's rule (Section 4.4)
The Substitution Rule (Section 5.5)
Integration by Parts (Section 7.1)
Trigonometric Integrals (Section 7.2)
Trigonometric Substitution (Section 7.3)
Integration of Rational Functions by Partial Fractions (Section 7.4)
Improper Integrals (Section 7.8)
Curves Defined by Parametric Equations (Section 10.1)
Calculus with Parametric Curves (Section 10.2)

Polar Coordinates (Section 10.3)
Calculus in Polar Coordinates (Section 10.4)
Sequences (Section 11.1)
Series (Section 11.2)
The Integral Test and Estimates of Sums (Section 11.3)
The Comparison Tests (Section 11.4)
Alternating Series and Absolute Convergence (Section 11.5)
The Ratio and Root Tests (Section 11.6)
Power Series (Section 11.8)
Representations of Functions as Power Series (Section 11.9)
Taylor and Maclaurin Series (Section 11.10)

linear algebra 2107

week #	DATES	TESTS	SECTIONS	TOPICS
1			1-3	
2			4.1	Vector Spaces and Subspaces.
3			4.2, 4.3	Null Spaces, Column Spaces, Row Space and Linear Transformations. Linearly Independent Sets, Bases.
4			4.4, 4.5	Coordinate Systems. The Dimension of a Vector Space.
5			4.5, 4.6	Rank. Change of Basis.
6			5.1, 5.2	Eigenvectors and Eigenvalues. The Characteristic Equation.
7			5.3, 5.4	Diagonalization. Eigenvectors and Linear Transformations.
8			5.5	Complex Eigenvalues.
9			6.1, 6.2	Inner Product, Length and Orthogonality. Orthogonal Sets.
10			6.3, 6.4	Orthogonal Projections. The Gram-Schmidt Process.
11			6.5, 6.6	Least-Squares Problems. Least-Squares Lines. Least-Squares Fitting of Other Curves.
12			6.7	Inner product Spaces.
13			7.1, 7.2	Diagonalization of Symmetric Matrices. The Spectral Theorem for Symmetric Matrices. Quadratic Forms.
14			7.2 (cont.), 7.3	The Principal Axes Theorem. Constrained Optimization.

The above weekly schedule is subject to change depending on the progress of the course.

multi variable calculus (2008)

Topics:

12.1 Three-Dimensional Coordinate Systems
12.2 Vectors
12.3 The Dot Product
12.4 The Cross Product
12.5 Equations of Lines and planes
12.6 Cylinders and Quadric Surfaces
13.1 Vector Functions and Space Curves
13.2 Derivatives and Integrals of Vector Functions
13.3 Arc Length and Curvature
13.4 Motion in Space: Velocity and Acceleration
14.1 Functions of Several Variables
14.2 Limits and Continuity
14.3 Partial Derivatives
14.4 Linear Approximations
14.5 The Chain Rule
14.6 Directional Derivatives and the Gradient Vector
14.7 Maximum and Minimum Values
14.8 Lagrange Multipliers
15.1 Double Integrals over Rectangles
15.2 Double Integrals over General Regions
15.3 Double Integrals in Polar Coordinates
15.4 Applications of Double Integrals
15.6 Triple Integrals
15.7 Triple Integrals in Cylindrical Coordinates
15.8 Triple Integrals in Spherical Coordinates
15.9 Change of Variables
16.1 Vector Fields
16.2 Line Integrals
16.3 Fundamental Theorem for Line Integrals
16.4 Green's Theorem

Tentative Lecture Schedule

Week	Dates	Sections
0	Sept. 8	12.1, 12.2
1	Sept. 13 - 15	12.3, 12.4
2	Sept. 20 - 22	12.5, 12.6
3	Sept. 27 - 29	13.1, 13.2
4	Oct. 4 - 6	13.3, 13.4
5	Oct. 13	14.1, 14.2
6	Oct. 18 - 20	14.3, 14.4
		Reading week
7	Nov. 1 - 3	14.5, 14.6
8	Nov. 8 - 10	14.7, 14.8
9	Nov. 12 - 16	15.1, 15.2, 15.3
10	Nov. 15 - 17	15.4, 15.6
11	Nov. 22 - 24	15.7, 15.8
12	Nov. 29 - Dec. 1	15.9, 16.1
13	Dec. 6 - 8	16.2, 16.3
14	Dec. 10	16.4

后面4个月：
1152 的 1, 2, 3.1-3.4, 4.1.1, 4.1.2
2152 的 4, 3.5 , 5

以及 2000 multivariable calculus

mathmatical analysis 1052-2052

week #	DATES	TESTS	book ch.	TOPICS
1			3-5	
2			7-9	
3			9-10	
4			11 14	
5			17-18	
6			19-20	
7			28–29	
8			30	
9			32 33	
10			34 36	
11			15 23	
12			37 24	
13			25 26	
14			31	

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multivariable calculus 2000

week #	DATES	TESTS	lectures	TOPICS
1			1-2	
2			3	
3			4	
4			5	
5			6	
6			7	
7			8	
8			9	
9			10	
10			11	
11			12	
12			13	
13			14	
14			15	

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